

DOCUMENT RESUME

ED 090 758

FL 004 465

AUTHOR Steinberg, Danny D.  
TITLE On Chomsky and Halle's Optimal Orthography.  
INSTITUTION Hawaii Univ., Honolulu. Dept. of Linguistics.  
BUREAU NO BR-1-0527  
PUB DATE 72  
CONTRACT OEC-9-71-0036 (508)  
NOTE 20p.; Working Papers in Linguistics, Vol. 4, No. 8, October-December 1972

EDRS PRICE MF-\$0.75 HC-\$1.50 PLUS POSTAGE  
DESCRIPTORS Deep Structure; \*English; \*Orthographic Symbols; \*Phonological Units; \*Reading Development; Spelling; Surface Structure; Teaching Models; \*Transformation Generative Grammar

ABSTRACT

Chomsky and Halle claim that an orthography based on their underlying phonological representations (UPR) of lexical items would be optimal for English. This paper challenges two of Chomsky and Halle's basic phonological assumptions: (1) that their Vowel Shift Rule is valid, and (2) that derived words do not appear as wholes in the lexicon. A less abstract phonological representation level based on the conscious perceptions of speakers, the surface phonemic representation (SPR), is proposed. An SPR-based orthography has advantages which a UPR-based orthography would not: it is easy to learn and teach; it can be learned at an early age; and it permits rapid detection of rhyme. It is concluded that an orthography based on SPRs, and not UPRs, would be optimal. (Author)

U.S. DEPARTMENT OF HEALTH  
EDUCATION & WELFARE  
NATIONAL INSTITUTE OF  
EDUCATION

THIS DOCUMENT HAS BEEN REPRO-  
DUCED EXACTLY AS RECEIVED FROM  
THE PERSON OR ORGANIZATION ORIGIN-  
ATING IT. POINTS OF VIEW OR OPINIONS  
STATED DO NOT NECESSARILY REPRESENT  
OFFICIAL NATIONAL INSTITUTE OF  
EDUCATION POSITION OR POLICY.

PERMISSION TO REPRODUCE THIS COPY-  
RIGHTED MATERIAL HAS BEEN GRANTED BY

*Mary Steiner*

TO ERIC AND ORGANIZATIONS OPERATING  
UNDER AGREEMENTS WITH THE NATIONAL IN-  
STITUTE OF EDUCATION. FURTHER REPRO-  
DUCTION OUTSIDE THE ERIC SYSTEM RE-  
QUIRES PERMISSION OF THE COPYRIGHT  
OWNER.

ON CHOMSKY AND HALLE'S OPTIMAL ORTHOGRAPHY<sup>1</sup>

Danny D. Steinberg<sup>2</sup>  
University of Hawaii

BEST COPY AVAILABLE

ABSTRACT

Chomsky and Halle claim that an orthography based on their underlying phonological representations (UPR) of lexical items would be optimal for English. This paper challenges two of C&H's basic phonological assumptions, that their Vowel Shift Rule is valid, and that derived words do not appear as wholes in the lexicon. A less abstract phonological representation level based on the conscious perceptions of speakers, the surface phonemic (SPR), is proposed. A SPR based orthography has advantages which a UPR based orthography would not: it is easy to learn and teach, it can be learned at an early age, and it permits rapid detection of rhyme. It is concluded that an orthography based on SPRs, and not UPRs, would be optimal.

INTRODUCTION

The investigations of N. Chomsky & Halle (1968) into the sound system of English have led them to posit a certain system of underlying phonological representations (hereafter, UPR) for lexical items. This system is of prime importance in these theorists' consideration of the problem of an optimal orthography for English. They hold that the process of reading will be facilitated to the extent that an orthography corresponds to their UPRs for lexical items.<sup>3</sup>

The rationale behind the view that an orthography based on their UPR level is one that would be optimal for reading, is perhaps most clearly expressed by C. Chomsky (1970) in what is essentially an elaboration of the Chomsky and Halle (hereafter, C&H) position. She states,

"Consider also the common items of words such as courage/courage-ous, or anxi-ous/anxi-ety, or photograph-photograph-y/photograph-ic. Although the phonetic variations are considerable, they are perfectly automatic, and the lexical spellings can ignore them. They will be introduced by the phonological component. Of course, the conventional orthography ignores them as well. These are good examples of cases where the conventional orthography, by corresponding to lexical spelling rather than phonetic representation, permits immediate direct identification of the lexical item in question, without requiring the reader to abstract away from the phonetic details, and presents the lexical item directly, as it were."  
[p. 291-2]

Thus, because it is believed that a UPR based orthography would permit "immediate direct identification" of lexical items, it is held that an optimal orthography would be one that is based on the UPR.

To illustrate the C&H view, let us first consider a lexical item. Chomsky and Halle (1968:218) assign the following derivation for the lexical item, mountain, to the competence of the English speaker:

	/müntən/	UNDERLYING PHONOLOGICAL REPRESENTATION
DIPHTHONGIZATION	mūwntən	PHONOLOGICAL RULES
VOWEL SHIFT	mōwntən	
RULE 93c	[māwntən]	PHONETIC REPRESENTATION

In the derivation, the phonetic representation of the lexical item [māwntən] is associated only indirectly to the underlying phonological representation /müntən/. This association is made by means of various phonological rules. On the other hand, the UPR /müntən/ is directly associated with the meaning of the lexical item since it is the UPR that is stored in the lexicon with meaning. The specification of the UPR will allow for the identification of an item and its meaning in the lexicon. Given this phonological system, one could then devise an orthography based on the UPRs of lexical items, e. g., <müntən> could symbolize /müntən/ (let angled brackets indicate an orthographic representation). One could also, of course, devise an orthography based on the phonetic representation of lexical items, e. g., <māwntən> for [māwntən].

According to Halle and the Chomskys, the UPR based orthography would be the superior orthography since it would provide input at a level closer to meaning. They say that orthographic input at the UPR level would not require the use of phonological rules in the recovery of meaning, whereas, orthographic input at the phonetic level would require the use of phonological rules in the recovery of meaning. With regard to performance and the use of rules, C. Chomsky (1970) states that, "In producing and interpreting speech, a speaker of the language constantly operates with rules such as these [phonological] . . . . In the course of acquiring his language he has internalized the rules of its phonological system, and as a mature speaker he operates in accordance with them both in speaking and in comprehending the spoken language." [p. 291] Thus it is that these theorists contend that a UPR based orthography would allow for a more rapid discovery of meaning than would a phonetically based one.

The UPR based orthography "permits immediate direct identification of the lexical item in question" while the phonetically based one requires "the reader to abstract away from the phonetic details" by the utilization of phonological rules.

While the account which C&H present regarding the optimality of an orthography for English based on their UPR analysis is interesting, there is reason to believe that it is not a valid one. C&H's phonological analysis unfortunately rests on a number of dubious assumptions: 1) the vowel shift rule is psychologically valid, 2) the C&H UPR is the only sound representation that is to be listed in the lexicon, and 3) derived forms cannot appear as whole words in the lexicon. Each of these assumptions will now be discussed in turn.

### DUBIOUS ASSUMPTIONS

#### DUBIOUS ASSUMPTION 1: THE VOWEL SHIFT RULE (VSR) IS VALID.

According to C&H, even the commonest of words have UPRs which differ significantly from their phonetic representation. For example, the vowels in words like time and team have UPRs which are not distinct from the phonetic representations in seem and same, respectively, where /i/ underlies [ā], and /ē/ underlies [ī]. Primarily because vowel alternations appear in a number of cases of related words such as severe-severity, divine-divinity, grave-gravity, and because this relationship can be specified with a VSR and certain other rules, C&H hold that speakers have internalized a VSR and operate in accordance with it in the production and understanding of lexical items. Since the VSR is considered to be a general rule, i. e., it operates on the UPRs of all lexical items unless an item is marked as an exception, the UPRs of most lexical items are therefore frequently required to have vowels which differ considerably from those in the phonetic representation. Thus, it is that C&H regard their UPRs and the VSR as part of the competence of the native speaker of English.

Suppose, however, that the VSR were not a rule that the English speaker knows and generally applies. If this were the case, then most of the UPRs for lexical items posited by C&H would be incorrect. The findings of an experiment which I have just conducted with my colleague, Robert Krdn, bear directly on this issue. I would now like to present a brief summary of that experiment, the findings of which will be reported to the International Congress of Psychology in Tokyo this summer.

VSR Validity Experiment. In our investigation the validity of the VSR was assessed by testing the rule's hypothesized productivity with regard to novel derived forms.

The subjects (Ss) were 25 native English speakers randomly chosen from an undergraduate psychology course. Five different vowels which, in the final syllabic position of the base form, are postulated by C&H to alternate in their derived forms, were selected for study. These vowels and their alternations are [āy] - [i] as in divine-divinity, [īy] - [e] as in extreme-extremity, [ēy] - [æ] as in sane-sanity, [ōw] - [ā] as in verbose-verbosity, and [āw] - [ʌ] as in pronounce-pronunciation. For each of the five different base form vowels, four or five different ordinary words were selected as experimental items. A total of 21 experimental items was presented to each S.

In a meaningful sentence context, Ss were to select one of two suffixes, affix it to the base given, and then pronounce the derived form. The suffixes were arranged so that either selection is hypothesized by C&H to trigger vowel shifting. However, since only one of the suffixes resulted in the appropriate part of speech for the context, Ss would usually make the same choice. So as to divert them from focusing upon the pronunciation of the forms, Ss were told that the experiment was attempting to determine their preference for suffixes. Post-experiment interviews with Ss indicated that none were aware that pronunciation, and not suffix choice, was the concern of the experiment.

The following are some of the test items with the two suffix choices presented for each. The suffix not in parenthesis indicates the contextually appropriate choice.

BASE	SUFFIX	BASE	SUFFIX
<u>maze</u>	ic (ity)	<u>drape</u>	ify (ic)
<u>snide</u>	ity (ical)	<u>tripe</u>	ical (ify)
<u>kerosene</u>	ical (ify)	<u>effete</u>	ity (ical)
<u>honeycomb</u>	ical (ify)	<u>overgrown</u>	ity (ical)
<u>house</u>	ify (ic)	<u>trout</u>	ical (ify)

As an example of meaningful context in which items were presented, the following is the one presented for the item trout:

"A trout is a fish. [Pause]. We had raised this trout from the time it hatched. When we released it in the river we watched to see if it had the swimming abilities of a free trout. It swam in a true BLANK fashion."

The Ss were required to repeat the final sentence, filling the blank with trout plus either -ical or -ify. The C&H theory predicts pronunciations of [trAtikəl] and [trAtifāy]. Preselection insured that the derived forms would be novel for the S. (Some of the derived forms are even actual,

but rare words, e. g., mazic.) The experiment was recorded on tape and presented aurally to each S individually. S's responses were recorded for later scoring.

Of the responses made by the 25 Ss to the items, it was found that there was no vowel change from the base to the derived form in over 90% of the cases. Of the 46 vowel changes that did occur, only 17 (about 3% of all responses) were in accord with the C&H prediction. Incidentally, no S said [trAtikəl] on the trout item. They all said [trāwtikəl].

These results clearly show that the C&H rule relating to vowel shifting is virtually unproductive. Consequently, the C&H claim that such a rule is psychologically valid is extremely doubtful. Even if one argues that the rule nevertheless is known by the speaker, it certainly cannot be considered to be "general", such as say the plural suffix rule of English which Berko (1958) demonstrated to be productive. At best, the VSR could only account for what would have to be called exceptions to the general pattern, that of non-alternation.

That the criterion of productivity is assigned so critical a role in the determination of the validity of rules, should not be surprising. Productivity is essential for distinguishing, as Maher (1971) neatly puts it, between generative phonology (the creative generativity of living language) and etymology. Sapir (1921) cautions against being "misled by structural features which are mere survivals of an older stage which have no productive life and do not enter into the unconscious patterning" [p. 140], as does Marchand (1969) who states, "Productivity of a derivative type therefore cannot be overlooked in a correct description of a linguistic system, and the linguist who neglects this particular factor [productivity] will be counting 'dead souls' as live people." [p. 5] The results of this experiment on productivity indicate that the C&H rules relating to vowel alternation do indeed concern "dead souls" and should not be attributed to the competence of the native speaker.

Consequences of Invalid VSR. The finding that the VSR is non-productive and thus cannot be a general rule of English renders invalid most of C&H's underlying phonological representations for lexical items. This implication follows because the VSR and other associated rules form the only link between the hypothesized UPRs and the phonetic representation. Granting the validity of the phonetic representation, the postulated nature of the UPR is contingent upon the validity of the rules which link it to a phonetic representation. Thus, if a linking rule such as the VSR is determined to be invalid, then the hypothesized UPRs depending on that rule cannot be valid. The surrendering of the VSR demands an extensive revision of C&H's UPRs, since lexical items with tense vowels in their phonetic representation, vowels such as īY, ēY, āY, ɔY, ā<sup>Λ</sup>, ā<sup>w</sup>, ū<sup>w</sup>, and ɔ<sup>w</sup>, would be assigned incorrect underlying representations. Such a



revision would result in UPRs that are less abstract, i. e., closer to the phonetic level of representation, than they are at present.

The necessity for a major revision of C&H's UPRs also renders less credible the rather extravagant claim of C&H (1968) that, "It is a widely confirmed empirical fact that underlying representations are fairly resistant to historical change, which tends, by and large, to involve late phonetic rules." [p. 49] Thus it is that C. Chomsky (1970) claims that a UPR based orthography would be adequate for "both British and American English, and the vast range of English dialects that exist within each country and around the world." [p. 295] Despite the C&H contention that it is a fact (a "widely confirmed empirical" one at that) that UPRs are resistant to historical change, there is reason to believe that this view is erroneous. The invalidation of the VSR as a general rule, with the consequence that underlying forms must be represented at a level closer to the phonetic level, leads one now to expect that the UPRs of lexical items may vary considerably from dialect area to dialect area.<sup>4</sup>

With variation in underlying forms, there can of course, be no simple solution to the problem of orthographic standardization. The selection of one dialect as a standard for the basis of an orthography cannot but result in some English speakers having more difficulty with it than others. Standardization of orthography is a real problem, and one from which there is no easy escape.

DUBIOUS ASSUMPTION 2: THE C&H UPR IS THE ONLY SOUND REPRESENTATION LISTED IN LEXICON. Even if the C&H VSR were a valid and general rule of English, the assumption that their UPR is the only sound representation that may appear in the lexicon is one that is highly questionable. They hold, for example, that words such as mountain, right, and sign, have only their UPRs /mūntən/, /rixt/, and /sign/, respectively, stored in the lexicon, even though such forms vary considerably from their phonetic representations. The phonetic representations [mā<sup>w</sup>ntən], [rāyt], and [sāyn], do not appear in the C&H lexicon.

In assessing the validity of this C&H assumption, it is relevant to ask if there is a period of life for English speakers when a representation close to the phonetic aspect of a lexical item must be said to be directly linked with its meaning. Such a question must be answered in the affirmative, for when as young children we learned the meanings of words, what we undoubtedly did was associate what we heard with a meaning. That is to say, we linked a relatively unabstract sound representation directly with a meaning. Thus, for example, when we learned the word mountain, what we did was to associate a meaning with something like the representation [mā<sup>w</sup>ntən]. Similarly, for right and sign we learned to associate meanings with sound representations like [rāyt] and [sāyn].



That the child first establishes for each word a direct connection between meaning and a near phonetic representation is a proposition that Chomsky would likely support, since it is his opinion that full knowledge of the sound system is acquired by the child fairly late. He states that,

"The conventional orthography corresponds closely to a level of representation that seems to be optimal for the sound system of a fairly rich version of ... spoken English. Much of the evidence that determines, for the phonologist, the exact form of this underlying system is based on considerations of learned words and complex derivational patterns. It is by no means obvious that a child of six has mastered this phonological system in full. He may not yet have been presented with the evidence that determined the general structure of this system .... It would not be surprising to discover that the child's intuitive organization of the sound system continues to develop and deepen as his vocabulary is enriched and as his use of language extends to wider intellectual domains and more complex functions. Hence the sound system that corresponds to the orthography may itself be a late intellectual product." [Quoted in C. Chomsky (1970), p. 301-2].

Thus, it appears that Chomsky would agree that at least until the child develops the underlying system of English phonology, the child must store something akin to a phonetic representation in his lexicon.

Abstract UPRs in Lexicon are Uneconomical. Now even if we grant that through the course of time, we develop the phonological rules and the underlying phonological representation which C&H postulate, is there any reason to suppose that in the process we would lose the original direct connection which had to have been established between the meaning and a near phonetic representation of a word? From a standpoint of efficiency, it seems more reasonable to assume that we continue to associate the meaning of a word directly with its near phonetic representation. How uneconomical it would be if we always had to involve many phonological rules in the production and understanding of speech, especially when we consider the derivational complexity which C&H claim is involved for most words. (Even for such an apparently simple word like spa, no less than five phonological rules are required by C&H in its derivation!) Given such phonological complexity, it does not seem possible to account for the fantastic speech with which speakers can interpret and produce speech.

In contrast, the postulation of a continuing near phonetic meaning association can significantly contribute to an accounting of rapid speech production and understanding, for there would be a great reduction in the amount of psychological work involved in relating meaning and sound. Considering that C&H in effect admit that speakers must learn a near phonetic and meaning association for many thousands of words during

their pre-school and early school years, and will have years of practice with these words, there is little basis for the C&H assumption that speakers lose this valuable learning simply because they learn more language and phonology as they grow older.

An Unenviable Dilemma. Furthermore, the C&H assumption that children come to form only an indirect connection between a phonetic representation and meaning for lexical items as they acquire phonological rules, obliges C&H to accept the psycholinguistic implication that, ceteris paribus, the rate at which children are able to produce and understand speech will decrease as they acquire more language! This implication follows from their theory because children must somehow use the phonological rules they acquire in order to associate the phonetic representation of a lexical item with a meaning, for, as C. Chomsky has stated above, "In producing and interpreting speech, a speaker of the language constantly operates in accordance with [phonological] rules . . ." Since in conversation, "immediate direct identification" of lexical items is impossible (speakers do not speak in UPR equivalents), speakers are therefore obliged, to use C. Chomsky's words again, to "abstract away from the phonetic details" by the use of the complex phonological rules that are learned in late childhood.

Actually, C&H are in a dilemma. They must hold that the acquisition of phonological rules will decrease a speaker's rate of speech production and speech understanding, or they cannot hold that a UPR based orthography will permit a more rapid recovery of meaning than one that is phonetically based. After all, C&H claim that a phonetically based orthography will slow down a reader because the reader must "abstract away from phonetic details." If, therefore, a reader of a phonetically based orthography is slowed down because he must use phonological rules, then the same must happen to a speaker in conversation for the speaker must also use such rules. Thus, in order to give substance to their view regarding the optimality of a UPR based orthography, C&H must claim that the rate at which children produce and understand speech will decrease as they acquire more language. While it is possible that this claim could receive empirical confirmation, I would not like to be the theorist whose views are dependent on such an outcome.

A much more viable thesis and one which, does not lead to such a dilemma is the one which I propose above, i. e., that a relatively unabstract near phonetic representation is the sound representation that is stored in the lexicon. Such a position should not be interpreted as implying that abstract phonological rules are not acquired. On the contrary, such rules are acquired and will be required in speech for the production and understanding of novel words. These rules will not be required, however, in the case of familiar words. This issue will be further considered in the following discussion which concerns another of C&H's assumptions.



DUBIOUS ASSUMPTION 3: DERIVED FORMS CANNOT APPEAR AS WHOLE WORDS IN THE LEXICON. According to C&H, words such as extremity, tabular, ramify, destruction, retention, and national, are not stored as single words in the lexicon. Morphemes such as {extreme}, {-ity}, {destroy}, {-tion}, etc., appear in the C&H lexicon, but the words extremity and destruction do not. C&H hold that such words must be generated from their morpheme constituents according to rule. Thus, every time a derived word is used, it must be created entirely anew from its component morpheme constituents.

However, because rules are necessary to account for such phenomena as the creation and understanding of novel derived words, is not sufficient reason to believe that such rules must continue to operate for words that were once novelly derived but which have become familiar, or for "derived" words the meanings of which were learned as a whole to the entire sound form. In my view, all of the meaning of a so-called derived word comes to be stored in the lexicon together with a sound representation of the whole word. That is, we learn to associate the meaning of the entire derived word directly with a sound representation.

The mediation of morphophonemic word-formation rules for making a sound-meaning pairing thus is not always required by the speaker. That mature speakers do know rules for affixing derivational morphemes is not denied. On the contrary, it is quite clear that speakers do have the capacity to create and understand novel forms from morphemes by the use of rules. However, it is fallacious to assume that just because a speaker knows such rules, he must always use these rules. A distinction between familiar and novel derived words should be made. While rules, for example, would be needed in order to coin novel words, such rules would not be needed for the production of familiar words. Familiar derived words would be stored as wholes in the lexicon.

There are a number of considerations which indicate that modification of C&H's hypothesis concerning the nature of a speaker's competence with regard to the lexicon is in order. For instance, a child may learn a great many derived words before he acquires what C&H consider full knowledge of the sound system (VSR, etc.). Very often, too, a derived form may be learned before the learning of a base form or any other constituent morpheme, e.g., elevator probably would be learned before elevate. In such cases, there could be no alternative, the whole word must be stored in the lexicon. Another consideration is performance economy. If a speaker's use of rules is significantly time-consuming, and since the rapid rate of speech production and understanding is a phenomenon to be accounted for, then the storing of whole words in the speaker's lexicon can help to explain that phenomenon.

An even more important consideration perhaps is the question of whether the speaker of English who has learned the meaning of a derived word as a whole, e. g., equator, and who also learned in separate contexts the meaning of what might be called its constituent morphemes, {equate} and {-or}, knows (in a competence sense) that the word equator is composed of those morphemes. C&H assume that the native speaker does have such knowledge. They assume (Chomsky & Halle:159, 197), for example, that speakers know that the word tabular has the morpheme {tabl}, and that the noun attribute has the morpheme {attrib}. C. Chomsky (1970:298) asserts that native speakers know that the words majority and resign have the morphemes {major} and {sign}, respectively. But is it the case that a speaker has such knowledge? Concerning this issue, Ladafoged (1970:25) wonders if C&H would claim that speakers who know the words mnemonic and amnesia, also know that each is composed of a constituent morpheme, {mne}. (Notice, too, that the m is pronounced in amnesia but not in mnemonic.) If our intuition is to be our guide, most of us would probably deny having knowledge of that {mne} morpheme.

Concerning intuition, I often find myself quite surprised to learn of the morpheme composition of even the most ordinary of derived words. Only recently did I realize that the morpheme {equate} forms the basis of the words equator and equatorial. I suspect that this phenomenon of morpheme surprise for derived forms is very widespread among speakers. While C&H can say that I unconsciously had this knowledge all along, it should be noted that C&H offer no evidence in support of their position on this critical issue.

I think that C&H would have a much stronger case if they had argued that words with inflectional, and not derivational, morphemes are not stored as wholes in the lexicon. It could be said that words composed with inflectional affixes such as the plural, possessive, and past tense, are created anew each time, i. e., that dogs, boy's, and jumped are not stored as whole words in the lexicon, that the morphemes {dog}, {PLURAL}, {boy}, {POSSESSIVE}, {jump}, and {PAST} are stored in the lexicon, and, that the words in question are created by morphophonemic rule whenever they are needed.

In support of this proposal, one could argue that the meanings of words with inflectional affixes have wholly predictable meanings, given that one knows the meaning of the inflectional morpheme and the stem morpheme to which it is affixed. Consequently, a speaker can be sure that the meaning of these constituent morphemes entirely determines the meaning of the whole word. The meaning of such words is completely exhaustive. On the other hand, one can never be certain about the meanings of words involving derivational morphemes. The meaning of equator or elevator is certainly not provided a speaker if he



only knows the morphemes {equate}, {elevate}, and {-or}. When coming across novel words composed only with derivational morphemes, there is no way for a speaker to know beforehand whether those morphemes do or do not give the meaning of the whole, or even whether they are at all relevant. Because of these and so many uncertainties and problems involved in a derivational morpheme analysis (see Maher 1969, 1971 for a brilliant exposition) it is extremely doubtful that a speaker actually creates the derived form, but rather stores those words as wholes in the lexicon.

## THE SURFACE PHONEMIC REPRESENTATION (SPR) LEVEL

Since the C&H Vowel Shift Rule is evidently not valid, and since some very basic C&H assumptions concerning the lexicon are extremely dubious, it is clear that a revision of the C&H UPR level is necessary. I propose that the UPR level be replaced with one which I term the surface phonemic representation level (hereafter, SPR). The SPR level is one which I maintain is psychologically real and one which can be rather clearly defined with respect to the C&H framework.

The essential characteristic of the SPR level is that it specifies a level of the sound system which ordinary native speakers can be said to be aware. Awareness on the part of speakers is not a criterion used by C&H in defining the UPR or phonetic representation levels. Thus, while C&H posit that the UPR for the word right is /rixɪ/, they do not expect speakers to be consciously aware of any of the segments of that form. Ordinary speakers, though, may be expected to be experientially aware of some, but not all aspects of phonetic representations. In contrast to the character of both the C&H UPR and the phonetic representation, I hold that a speaker may be expected to be entirely aware of the composition of the SPR, for such representation is to be based wholly on a consideration of what it is that the ordinary speaker consciously perceives concerning the sound structure of words.

Actually, because C&H do not use awareness as a principal criterion for determining a level of sound representation, they have difficulty in accounting for a most common language phenomenon, a speaker's report of what it is he hears when a word is spoken to him. Suppose, for example, that the word pipe is uttered and a speaker is asked to report on what sounds compose that word. Suppose, too, that he reported that the initial and final consonants were the same, both were "pee," and that the vowel was "[æy]". Are we to conclude that the speaker has mixed two different sound levels in his report? C&H would have to claim so, for according to them, the consonant report must have originated from the UPR level since aspiration is not distinctive there (it is indicated at the phonetic level), while the vowel report must have originated from the phonetic level where the vowel approximates æy rather than i which is the vowel at the UPR level.



The SPR level which I am proposing has a great deal in common with the phonemic level proposed by the structuralists and with that level recently proposed by Schane (1971). The SPR consists of segments which are composed only of what C&H call 'phonological' features. Uniquely 'phonetic' features such as aspiration would not be included in an SPR specification since such features are not consciously distinctive to the native speaker. Similarly excluded from the SPR are integers corresponding to quantitative physical attributes, such as amount of aspiration and amount of tenseness, since these, too, are characteristics of which native speakers are normally not aware.

The SPR level differs, however, in a few important respects from the systematic phonemic level of most generativists. In particular, I hold that a speaker stores the SPRs of both morphemes and whole derived words in the lexicon. Thus, both the words extreme (SPR = /ekstrīm/) and extremity (SPR = /ekstremitī/), and the morpheme suffix {-ity} (SPR = /itī/) each appear in the lexicon with a meaning. Principally as a result of this revision of the lexicon, theorists no longer need posit a very abstract level of representation. A more abstract level is not required either to replace the surface phonemic level (the C&H proposal), or to complement the surface phonemic level (the Schane proposal).

In line with most generative theorists, I do not think that words having inflectional affixes usually appear as wholes in the lexicon. An inflected word may be generated by affixing an inflectional morpheme to a stem according to rule. Thus while we would expect to find listed in the lexicon the SPRs of such words as cliff, erase and Richard, we might not expect to find cliffs, erased and Richard's listed there, too. I say that we might not "expect" to find the latter items because I do not want to exclude the distinct possibility that highly frequent inflected words appear in their entirety in the lexicon. Thus, words like cats, dogs, Mary's, jumped, etc., may very well be listed as wholes in the lexicon of many speakers.<sup>5</sup> Typically, however, inflected words seem to be generated according to rule.

The SPR level which I propose corresponds rather closely to the descriptive system used by Kenyon & Knott (1944). It also corresponds closely to what C&H for the most part use throughout The Sound Pattern of English as the 'phonetic' representation. When presenting derivations, C&H usually do not indicate all of the raw phonetic details which they regard as necessary for a full phonetic representation (aspiration, integers, etc.). I submit that the underlying reason why C&H find it useful to use the abbreviated transcription and why it might be expected that their readers would find it easy to comprehend is that their reduced phonetic representation approximates a truly psychological level, that of the SPR.

Thus, I conclude that only an SPR description, based on a slow and careful pronunciation of words in isolation (words like writer and rider will therefore be distinguished), can provide the proper phonological foundation for an optimal orthography.

### ADVANTAGES OF AN SPR BASED ORTHOGRAPHY

The SPR based orthography would permit a reader to recover the meaning of words at least as rapidly as has been claimed for C&H's hypothesized UPR based orthography. Since words written in a SPR based orthography would provide input at the SPR level, and, since the SPR of a word (or its constituent morphemes) is directly connected to its meaning, i. e., the SPR of a word is listed with its meaning in the lexicon, the mediation of rules would therefore be unnecessary. A SPR based orthography thus would allow for a direct identification of meaning and would not require the reader to "abstract away from phonetic details".

While as far as recovery speed for meaning is concerned, the SPR based orthography has the same advantage as C&H's UPR based orthography, the SPR based orthography has other important advantages which are not shared by the UPR based orthography. Three such advantages of a SPR based orthography are: 1) it is easy to teach and to learn 2) it may be learned at an early age, and 3) it permits a rapid detection of rhyme. Each will now be discussed in detail.

#### Advantage 1: SPR Based Orthography Easy to Teach and Learn.

If an orthography is to be considered as a candidate for optimality, it should be relatively easy to teach and to learn. Essentially, normal persons who have learned their language, may learn an orthography by either of two methods of presentation. In the first, let us call it the orthography-object method, an orthographic form is presented in association with an object or event, e. g., the instructor presents <dog> written on paper and points to an actual dog. In the second, let us call it the orthography-utterance method, an orthographic form is presented in association with a speech utterance, e. g., the instructor presents <dad> written on paper and says [dæd].

The first of these methods, the orthography-object method, is one that is often time-consuming and impractical. We don't always have objects and events, or pictures of objects or events at our disposal. Nor is it possible to present a direct representation for a variety of words in our vocabulary, e. g., prepositions and articles: to, with, the, a; feelings: pain, heat, wet; abstracts: intelligence, theory, quality. On the other hand, the second method, that of orthography-utterance, does not have such drawbacks. It requires only that an utterance be presented along with the orthographic form. As long as the learner can understand speech, he will know what word it is that the orthographic form is attempting to represent. It is not necessary for the learner to utter the word himself.



Suppose that one wanted to teach an orthography based on C&H's UPRs. Because of the limitations of the orthography-object presentation method, one would wish to use the orthography-utterance method. However, because the orthography-utterance method requires that words must be uttered by the instructor, the question arises as to whether an instructor teaching the UPR based orthography, should attempt to pronounce a phonetic equivalent of the UPR of the lexical item.<sup>6</sup> If one did attempt to pronounce the UPRs, certain major difficulties would immediately be encountered.

Firstly, a great many of C&H's UPRs would be difficult to pronounce since some words have segments which never occur in spoken English. We do not, for example, have the sound  $\bar{o}$  in English ( $\bar{o}$  is a rounded  $\bar{e}$ ). Yet,  $\bar{o}$  is the vowel found in the UPRs of such common words as boy, toy, and joy. Neither do we have the x which appears in /rix/, the UPR of right. Even if an instructor were able to pronounce these UPRs, it would not likely be apparent to the learner what words such weird utterances were meant to represent. Under such conditions the orthography could not begin to be learned.

A second great difficulty relating to any attempt to teach a UPR based orthography by the pronunciation of UPRs is that many such forms would be misleading if uttered. For example, since the word mouse is given the underlying form /mūs/, if pronounced it would sound like the word moose. Other common lexical items which would mislead a learner are words like time, team, tame, whose C&H underlying forms would be pronounced like the words team, tame, and tam, respectively. The incidence of misleading items would thus be very high.

A final difficulty with attempting to pronounce UPRs, and one that is similar to the first, is that even if the pronounced UPRs sounded like English many words would come out as nonsense syllables. How would one know that the pronunciation of UPR /re=duke/ relates to reduce, or that the UPR /mūntən/ when pronounced relates to mountain? Clearly, because of this and the other difficulties, an approach which would involve the pronunciation of UPRs is not a viable one. If one wishes to teach the C&H UPR based orthography, it thus appears necessary to rely upon the normal pronunciation of words. Such an approach is the one which C. Chomsky uses in dealing with the problem.

However, if presented with the normal pronunciation of words, the learner of a UPR based orthography will still run into great difficulty. Given a pronunciation, what the learner must do is to recover the UPR of that word. A learner cannot simply match what he hears with the segments of the presented orthographic string in order to determine the proper value of each orthographic segment. In C. Chomsky's words, what the learner must do is to "abstract away from the phonetic details"

# BEST COPY AVAILABLE

of the pronounced word in order to arrive at its UPR. For, only then will the learner have the opportunity to make the proper comparison (the UPR phonological string with the UPR orthographic string) and be able to determine precisely what it is that each orthographic symbol is designed to represent.

For example, suppose that in attempting to teach an orthography based on the UPRs proposed by C&H, the word right is uttered and the UPR written form is shown to a learner, in accord with the orthography-utterance method. Since according to C&H, the UPR for right is /rix<sup>y</sup>t/, the learner will not learn what he is supposed to if he compares the conscious interpretation of what he perceives (perhaps /rā<sup>y</sup>t/) with the symbols of the orthographic string, e. g., <rix<sup>y</sup>t>, that is presented to him. He is not aware of a velar fricative /x/. What he must do is to recover the UPR /rix<sup>y</sup>t/ from the speech input (presumably through the use of phonological rules), and then match /rix<sup>y</sup>t/ with <rix<sup>y</sup>t> so that the proper phonological value of each orthographic symbol can be determined.

However, because underlying phonological forms are posited by C&H to exist at an unconscious and very abstract level, it is possible that a learner may never even consider that it is the UPR that is to be related to the orthography. If such is the case, the UPR based orthographic system would never be learned. While it might be hoped that a learner's attention will focus on the UPRs of words through the presentation of exercises such as those which C. Chomsky recommends, the efficacy of such remedies is highly questionable. The following interchange with a child described as "... a seventh-grade girl, a child of average intelligence but a poor speller ..." from C. Chomsky (1970:304) illustrates this point rather vividly.

"The next try showed how little understanding she had of the idea that words are actually connected to each other in meaning and form, even words that she was perfectly familiar with.

--How do you spell "sign"?

S-i-g-h-n

--What do you call it when you sign your name?

Your signature

--How do you spell "signature"?

S-i-g-n...

--OK. So how do you spell "sign"?

S-i-g-h-n

--But you told me that "signature" begins with S-I-G-N ...!

So what's one got to do with the other?"



If, after such an exchange, a seventh-grade child of average intelligence still does not realize that such words as sign and signature are related and share UPRs, even though they are words with which she is perfectly familiar, then clearly, the crucial hypothesis that the orthography is related to the UPRs of lexical items is one that is very difficult to elicit. No such difficulty, however, attends an SPR based orthography.

That it is elements of the SPR level which are to be associated with elements of the orthography, is a relatively easy idea for a learner to acquire. One can prime, so to speak, the SPR level of a speaker rather directly. For example, one might utter a sound and then ask a learner to reproduce or identify the sound which he has heard. Suppose the teacher utters the diphthong [ā<sup>y</sup>]. The child could then be asked to reproduce the sound that he heard, or he could be asked to select the vowel sound he heard from a number of choices, e. g., [ā<sup>y</sup>] or [i]. We would expect any normal speaker to be able to perform such tasks without difficulty. Where it would be inappropriate or misleading to deal with a sound unit in isolation, as with [g] or [t], selected contexts or minimal pairs may be used. The learner of an SPR based orthography could be told explicitly and in relatively simple language what it is that he must learn. He could be told that different orthographic elements represent sounds that he hears.

There would be no problem in communicating the basic principle of the SPR system. Examples could be given and explained without a great deal of difficulty. Because of the high saliency of consciously perceived sounds, a learner would probably experience little trouble in determining the basic orthographic principle even if he were taught to read SPR based materials wholly through inductive means.

To the learner of an abstract UPR based orthography, an instructor could only say something to the effect that each orthographic element represents not an actual sound, but something that underlies the sound. Such a statement would, of course, be of little help to the learner, since he is not consciously aware of any abstraction which underlies what he hears. Only special linguistic training could possibly make a learner (and an instructor) intellectually cognizant of what it is that a UPR based orthography attempts to represent. Of course, given the nature of UPRs, it is not likely that any amount of training can ever bring UPRs to awareness.

The non-conscious character of UPRs would also be a great handicap to spellers of a UPR based orthography. Conscious effort can do little directly for those spellers. On the other hand, conscious effort can do a great deal for spellers of an SPR based orthography. All the SPR speller need do is to bring to consciousness the sound representation of the word he wants to spell, and then select the appropriate letters from his inventory of orthographic symbols.

Advantage 2: SPR Based Orthography May Be Learned Early.

Because the learner must first know the phonological rules which relate phonetic representations to UPRs before he can learn a UPR based orthography, children would ordinarily be halfway through grade school by the time they would be ready to begin to master such an orthography. For, according to the Chomskys, "... full knowledge of the sound system that would correspond to a UPR based orthography is not yet possessed by the child of six or seven, and may indeed be acquired fairly late." [C. Chomsky, 1970:301] C. Chomsky's solution to this problem of having to wait until children acquire the necessary phonological rules of their language, is to accelerate their rate of language acquisition, i.e., teach them more language. Specifically, she advocates the teaching of a rather sophisticated vocabulary in the early grades. She holds that

"Extending the child's vocabulary to include Latinate forms and polysyllabic derived forms is one of the best ways to provide him with the means of constructing the phonological system of his language more fully as he matures. He ought to become familiar with word groups such as industry-industrial, major-majority, history-historical-historian, wide-width, sign-signature, etc., and have their relationships made explicit for him." [C. Chomsky, 1970:302]

However, even if such learning would facilitate and accelerate the internalization of the phonology of the language, the teaching that would be necessary to instill the necessary language knowledge would itself take a great deal of school time. A child would still be relatively old before he would be ready for an orthography that was UPR based. Also, because the more sophisticated aspects of language would have to be acquired by children before they could learn the systematic foundations of a UPR based orthography, children of less than average intelligence or with less language development would be placed at a serious disadvantage in the learning of reading with respect to his peers.

It should be pointed out that C. Chomsky does not advocate that reading be delayed entirely until the child acquires complete knowledge of the sound system. What she does hold is that reading be taught, but that "At some point emphasis ought to be shifted away from the phonetic aspects of spelling to a consideration of the underlying lexical properties of the orthographic system." [C. Chomsky, 1970:297] However, consider the burden that is being placed on the child. The child will be required to unlearn much of what he has already learned. He must even unlearn a hypothesis that would have been confirmed very often in his experience, the hypothesis that the orthography relates to a level of representation that is close to the phonetic. Since so many words have vowels and consonants that are much the same in both their UPR and phonetic representation, a learner could receive frequent confirmation of this especially salient



hypothesis. Because the child who is to learn a UPR based orthography must unlearn many of the sound-symbol correspondences he has learned and must learn a new principle for orthography after having learned another, such a task cannot be expected to be an easy one for him.

Advantage 3: SPR Based Orthography Permits Rapid Detection of Rhyme. Granting that in the lexicon it is the SPR of a word that is stored with its meaning, an SPR based orthography would permit a reader to detect rhyme rather quickly. Such a feature is an important one, especially in the reading (silently or aloud) and the writing of poetry.

Consider:

(1) He though it right so he flew a kite,

or (2) It the sign of someone divine,

How would C&H account for the rhyme between right and kite or sign and divine with their phonological system and their UPR based orthography? Since the UPRs for the first pair are /rixɪ/ and /kɪt/, and for the second pair are /sɪn/ and /dɪvɪn/, it is clear that rhyme cannot be perceived at the UPR level. Obviously rhyme must occur at some other level which is less abstract. An orthography based on C&H's UPRs, therefore, would require a reader to do some phonological processing in order to obtain a sound representation on the basis of which rhyme may be detected. Such processing is necessary on the basis of the C&H system since only UPRs are listed with meanings in the lexicon.

On the other hand, no such time-consuming processing would be required by an SPR based orthography since such an orthography would provide input directly to a level at which rhyme may be perceived. Since the SPRs for the lexical items cited above would be /raɪt/ and /kɑɪt/, and /sɑɪn/ and /dɪvɑɪn/, the detection of rhyme becomes a much less complicated matter.

### OPTIMAL ORTHOGRAPHY FOR ENGLISH

Considering (1) that Chomsky and Halle's assumptions regarding the validity of the Vowel Shift Rule and the exclusion of derived words from the lexicon are extremely dubious, considering (2) the probable validity of the Surface Phonemic Representation level, and considering (3) the advantages of an SPR based orthography, i. e. it is easy to teach and learn, can be learned at an early age, and will permit a rapid detection of rhyme, I must conclude that an orthography based on C&H's UPRs would not be one that is optimal for English. A more likely candidate for the optimality award would be an orthography that is based on the proposed SPR phonological level.

REFERENCES

BEST COPY AVAILABLE

- BERKO, J. The child's learning of English morphology. Word, 14, 1958, 150-177.
- CHOMSKY, C. Reading, writing, and phonology. Harvard Educational Review, 40, 2, 1970, 287-290.
- CHOMSKY, N. and HALLE, M. The sound pattern of English. New York: Harper and Row, 1968.
- KENYON, J. and KNOTT, T. A pronouncing dictionary of American English. Springfield, Mass.: Merriam, 1944.
- KIPARSKY, P. Linguistic universals and linguistic change. In E. Bach and R. Harms (Eds.), Universals in linguistic theory. New York: Holt, Rhinehart and Winston, 1968.
- LADAFOGED, P. The phonetic framework of generative phonology. UCLA Working Papers, 14, 1970, 25-32.
- MAHER, J. P. The paradox of creation and tradition in grammar: sound pattern of a palimpsest. Language Sciences, 7, Oct. 1969, 15-24.
- MAHER, J. P. Etymology and generative phonology in traditional lexicon. General Linguistics, 11, 2, 1971, 71-98.
- MARCHAND, H. English word-formation. (2nd ed.) Munich: Beck, 1969.
- SAPIR, E. Language: An introduction to the study of speech. New York: Harcourt, Brace, Harvest Books, 1921.
- SCHANE, S. The phoneme revisited. Language, 47, 3, 1971, 503-521.
- STEINBERG, D. Would an orthography based on Chomsky and Halle's underlying phonological representations be optimal? Working Papers in Linguistics, University of Hawaii, 3, 3, 1971, 1-18.



FOOTNOTES

BEST COPY AVAILABLE

1. This research was supported in part by Office of Education contract OEC-9-71-0036(508), project 1-0527, to D. Steinberg and R. Krohn. I am particularly indebted to Robert Krohn for his helpful comments and many ideas. I would also like to thank Charles-James Bailey and Anatole Lyovin for their stimulating discussions of the issues. This paper has been greatly revised and expanded from an earlier working paper (Steinberg, 1971).

2. Request for reprints should be sent to Danny D. Steinberg, Department of English as a Second Language, University of Hawaii, Honolulu, Hawaii 96822.

3. To avoid a possible misunderstanding, it is perhaps best to state now that I do not object to the postulation of underlying phonological representations. In fact, later in the paper I propose an underlying phonological representation level which I call the surface phonemic (SPR). The SPR is an alternative to C&H's particular underlying phonological representation level which I will often refer to as UPR.

4. One prominent generative phonologist who does not appear to share the C&H view is Kiparsky (1968:187). He presents an example of two closely related Swiss-German dialects which have different UPRs. One dialect is postulated to have a 3 height vowel system, the other, a 4 height vowel system.

5. Since speakers are unaware of any difference between the final consonant on cats and the one on dogs, the SPR would give both the same representation, as do generative phonologists, albeit for a different reason. This analysis contrasts with that of the structural phonemicist who would assign two different phonemic representations to the consonants in question, an /s/ for cats and a /z/ for dogs. Whether the [ɪz] on foxes should or should not include a vowel in its SPR, as /s/ or as /ɪs/ is not clear. (/z/ or /ɪz/ is another possibility.) Perhaps the vowel should be included because speakers are quite aware that fox is composed of one syllable but that foxes is composed of two. No change in the syllable count occurs with the pluralization of cat or dog.

6. Although according to C&H the UPR is related only indirectly to pronunciation (via phonological rules), such a theoretical formulation does not preclude attempts at a direct pronunciation of the phonetic equivalents of UPRs for practical purposes such as language learning or reading.



DOCUMENT RESUME

ED 090 759

FL 005 051

TITLE Cartel: Annotated Bibliography of Bilingual Bicultural Materials, No. 9.

INSTITUTION Education Service Center Region 13, Austin, Tex.

SPONS AGENCY Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C. Div. of Bilingual Education.

PUB DATE Sep 73

NOTE 20p.; Publication of the Dissemination Center for Bilingual Bicultural Education

EDRS PRICE MF-\$0.75 HC-\$1.50 PLUS POSTAGE

DESCRIPTORS \*Annotated Bibliographies; Audiovisual Aids; Biculturalism; \*Bilingual Education; Bilingualism; \*Classroom Materials; Educational Resources; Instructional Aids; \*Instructional Materials; Instructional Media; Resource Materials; Spanish

IDENTIFIERS Elementary Secondary Education Act Title VII; ESEA Title VII

ABSTRACT

This booklet contains an annotated listing of instructional materials for use in bilingual-bicultural programs. Each entry includes the following information: title, author or developing agency, name and address of the publisher, publication date, number of pages, language(s) used, intended audience or level, and a descriptive statement. Any information omitted was not available at press time and may be requested from the publisher. Entries are listed alphabetically by title. (SK)

# CARTEL

## ANNOTATED BIBLIOGRAPHY OF BILINGUAL BICULTURAL MATERIALS No. 9

U.S. DEPARTMENT OF HEALTH,  
EDUCATION & WELFARE  
NATIONAL INSTITUTE OF  
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

SEPTEMBER, 1973

DISSEMINATION CENTER  
FOR  
BILINGUAL BICULTURAL EDUCATION

6504 Tracor Lane  
Austin, Texas 78721  
(512) 926-8080

The material reported herein was performed pursuant to a Grant from the U.S. Office of Education, Department of Health, Education and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

The Dissemination Center for Bilingual Bicultural Education is a special ESEA Title VII project funded by the U.S. Office of Education through the Education Service Center, Region XIII. The opinions expressed herein do not necessarily reflect the position of the Center or of the Education Service Center, Region XIII.

This publication was developed and printed with funds provided by Title VII of the Elementary and Secondary Education Act of 1965. Therefore, it is in the public domain and may be reproduced for local use.

Dissemination Center  
for  
Bilingual Bicultural Education  
Juan D. Solis, Director

Education Service Center, Region XIII  
Austin, Texas 78721

Joe Parks, Executive Director

#### SUBSCRIPTION INFORMATION

*CARTEL*.—*Annotated Bibliography of Bilingual Bicultural Materials* is published monthly by the Dissemination Center for Bilingual Bicultural Education. The December issue is cumulative for the preceding calendar year and includes an Index. Subscription year: July-June. All Programs funded under Title VII ESEA automatically receive a yearly subscription free of charge. Additional yearly subscriptions, and subscriptions for persons or institutions other than Title VII ESEA, \$10.00. The Cumulative issue (December) may be purchased separately at \$3.70 per copy. All subscriptions are due and payable in advance, by check or purchase order. Editorial communications and materials for inclusion should be addressed to *CARTEL*, C/O Research Librarian, Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. This material is not published under copyright; it is in the public domain and may be reproduced for local use.

## INTRODUCTION

CARTEL is designed to serve as an informative listing for educators, librarians, and others interested in materials for use in bilingual, bicultural education.

The intent of this annotated listing is to share with bilingual, bicultural project personnel the information needed for making decisions in the acquisition of relevant materials for use in their programs. The descriptions will serve the purpose of informing objectively, rather than of recommending or disparaging items included. We include any materials received or suggested to us that are relevant. Where possible, the actual materials are viewed.

In each case the publisher is the source for further information; addresses are included.

A typical annotation includes information in the following order: Title, Author or developing agency, Name and address of the publisher, Publication date, Number of pages, Language(s) used, Intended audience or level, and a Descriptive statement. Any such information omitted was not available at press time and may be requested from the publisher. Entries are listed alphabetically by title.

★ indicates materials published by or available from the Dissemination Center for Bilingual Bicultural Education. Fiscal procedures require prepayment or a purchase order in the amount indicated—no tax or postage should be added. RLISH orders will have the additional postage added on the invoice.

We will be most appreciative of your suggestions; project personnel and other readers are urged to submit pertinent materials information to the Research Librarian, Joanna F. Chambers, for inclusion in this publication.

**CRITERIA FOR RELEVANCE AS DEFINED FOR SELECTION AND INCLUSION IN THIS BIBLIOGRAPHIC LISTING:**

Categories 1 and 2 must apply in each case; one or more of categories 3-9 must also apply.

1. Material is published or available in the United States, its territories, or possessions
2. A source address is available to whom readers can direct inquiries and orders
3. Material is in a language in which a Title VII ESEA program is operating
4. Material is designed for use in the education of speakers of any language in which a Title VII ESEA program operates
5. The material is written in two or more languages, one or more of which is a language in which a Title VII ESEA program is operating
6. The material features ethnic groups or aspects of the culture of an ethnic group with which a Title VII ESEA program is operating
7. The material was developed, adapted or produced by, or for use in, a bilingual program
8. The subject of the material contributes to the training of staff to work with bilingual, bicultural, or non-English-speaking persons
9. The subject matter of the material is useful for furthering the progress or success of bilingual, bicultural programs

## TABLE OF CONTENTS

TITLE	PAGE
<i>Curriculum Materials</i>	
Aprendemos con Gusto .....	7
Bilingual-Bicultural Leadership Development Project: Curriculum Guide .....	7
Caderno de Estudos Sociais: Curriculum Guides .....	8
Caderno de Matemática da 4a Classe .....	8
Curriculum Guides—St. Martin Parish .....	9
Daily Curriculum Guide for Pre-School Spanish Speaking Children .....	10
Forming an Estudiantina and Symbols of Music Notation .....	11
Handbook on Mexico for Elementary and Secondary Teachers (Revised) .....	12
Learning to Learn/Aprendiendo a Aprender: Cognitive Growth Kits .....	12
Livros de Leitura (Portuguese Readers) .....	13
Matematica Moderna, 5a Classe .....	14
Mi Libro .....	14
Saúde: Curriculum Guides .....	16
Small Group Activity Charts .....	16
Spanish Phonic Pull Charts .....	17
Spanish Reading Charts .....	17
Things To Do—Activities for a Bilingual Classroom .....	19
<i>Teacher Training</i>	
Each One Learning .....	11
Puedo Leer—I Can Read .....	15
They Help Each Other Learn .....	18
We Learn Together .....	19





***Aprendemos con Gusto! Actividades en Español Para***  
★ ***Niños Bilingües.*** Developed by the Regional Project Office, San Bernardino, California, Charles H. Herbert, Jr., Project Director. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 100pp. \$1.95. Spanish: Grades 1-6.

A series of seventy lesson plans in the form of task cards, designed to implement Spanish language usage in the classroom in many areas of instruction: Art, Math, Reading, Science, Writing, Social Studies. Each includes the Purpose (in English), Materials, and Instrucciones (in Spanish). All procedures are spelled out so as to reinforce the small group process. Instructions for task card preparation and evaluation are included. Sample activity themes: Arte—Caras Cómicas, Primavera; Matemática—Bingo, Jugando a la Pesca; Lectura—Busca el Dibujo, Receta; Ciencia—Experimento de Frijoles, Insectos; Escritura—Escribiendo un Cuento Juntos, Diccionario; Estudios Sociales—México, Vamos de Compras.

***Bilingual—Bicultural Leadership Development Project:***  
★ ***Curriculum Guide.*** Pomona Unified School District, Pomona, California. Ken Noonan, Project Director. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1973. 192pp. \$.05 per page reproduction cost (Xerox). English: Educators (Grade 7-9).  
Alternate title: A Curriculum Guide for Bilingual Leadership Through Speech and Drama.

Students are placed, in this bilingual program, in beginning and advanced levels of bicultural leadership training. Objectives and description for each (Bilingual I and Bilingual II) are detailed; guidelines are presented in several areas;

Leadership Development, Speech, Parliamentary Procedures, Drama, Language, and Ethnic Studies. About one third of the guide is comprised of listings of Resource Materials (Texts and Sources) at all levels, curriculum and supplementary. Sheets are provided for evaluation of objectives. Material in this resource manual are adaptable to many grade levels.

### **CADERNO DE ESTUDOS SOCIAIS: CURRICULUM**

★ **GUIDES.** Developed by the ESEA Title VII Bilingual Program, New Bedford, Massachusetts (Abel D. Fidalgo, Director): Maria G. Alves and Aida P. Wallbank. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. \$.05 per page reproduction cost (Xerox). Portuguese. Grades 3, 4, 5.

*Caderno de Estudos Sociais da 3a Classe.* 94pp. (Student Edition). Units covered include Cities, Physical Geography, Economics, Anthropology and Sociology. The material is illustrated and includes worksheets. Tests are not included in this edition.

*Caderno de Estudos Sociais da 4a Classe.* 92pp. (Student Edition). Units include the study of a Country, Anthropology, Sociology, Economics, Political Science, Man and his Environment, History, and the Study of a Foreign Country: Cabo Verde, Portugal.

*Estudos Sociais da V Classe.* 120pp. This guide is divided into seven sections: 1) Review of Social Studies; 2) Indians and their Ancestors; 3) The Settling of America; 4) Early Societies in America; 5) The Forming of a New Nation; 6) The Development of a New Nation; and 7) Our Nation in Relation to Other Nations of the World.

*Caderno de Matemática da 4a Classe.* Developed by the ★ ESEA Title VII Bilingual Program, New Bedford, Massa-

chusetts (Abel D. Fidalgo, Director); Maria G. Alves, Lourdes Oliveira, and Maria A. Franco. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 102pp. \$.05 per page reproduction cost (Xerox). Portuguese. Grade 4.

Student's text and workbook for fourth-level mathematics. Progression begins with algebraic expressions, and moves through word problems, positive and negative concepts, symmetry, square roots and powers and various other arithmetic exercises.

**CURRICULUM GUIDES—ST. MARTIN PARISH BILINGUAL EDUCATION PROJECT.** Jane Comeaux, and others, St. Martin Parish Project, Breaux Bridge, Louisiana. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1973. \$.05 per page reproduction cost (Xerox). French with English: Educators (Grades 2,3).

This series of curriculum guides interrelates material applicable to Language Arts, Social Living, Art, Music, Physical Education, Science and Reading with various Activities.

**Unit: La Boucherie (Grade Two).** 43pp. Objectives, charts outlining general unit content such as structures, processes, materials, games, phonetic analyses, visual aids, etc., are presented at the beginning; an evaluation sheet is found at the end. The methodology stresses the use of real objects (tasting, feeling, etc.), some insight into the sounds of [ o ] and syllabication, and group activities. A film made in France, La Boucherie, is available in Breaux Bridge, Louisiana.



**Unit: Crawfish (Grade Two, Unit VI).** 45pp. Objectives are followed by a unit outline of structures, processes, materials, games, phonetic analyses, activities, dialogues, visual aids, etc. Following the presentation of the material are notes on the methodology of oral reading, procedures suggested by Yolande Plante, French Curriculum Consultant. Pictures for use as transparencies, and physical activities follow.

**Unit: The Acadians (Grade Three, Unit VI).** 63pp. Objectives are followed by charts indicating structures, processes, materials, games, phonetic analysis, manual activities, dialogues, visual aids, and resources to be employed in the unit. Transparencies are used in presentation of initial lessons; activities geared to the various curriculum areas are interspersed. Notes on an oral reading methodology by Yolande Plante, French Curriculum Consultant, are included.

**★ Daily Curriculum Guide for Pre-School Spanish Speaking Children.** Developed by the Spanish Dame School Education Project, Santa Clara Office of Education, San Jose, California. Toni Micotti, Program Manager. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1973. Vol. I—323pp.; Vol. II—96pp.; Vol. III—300pp.; Total of 787pp. Spanish: Educators of 3- and 4-yr. olds; reading readiness.

Volume I—Daily Curriculum: Weeks 1-15.

Volume II—Daily Curriculum: Weeks 16-30.

Volume III—Supplements (Pictures, stories, songs, games, list of audio visuals, and other materials needed for the program).

Designed for use by para-professionals (called "home tutors") with small groups of children whose first language

is Spanish. Children are taught in the homes of the children with the mothers rotating turns as hostesses. The program strives to improve Spanish language skills, basic listening and verbal skills in English, assure basic concept development in the child's primary language, Spanish, and to train mothers of project children in new methods of working with their children. Twenty-eight multisensory concepts are presented through discussions, story telling, songs, finger plays, role playing, games, films, records, flannel board presentations, arts and crafts, outdoor structured play, and free play.

***Each One Learning—A Small Group Process Manual.***

- ★ Jean M. Baker, Joy Ross, Barbara Walters; edited at the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1971 (3rd printing) 70pp. \$1.75. English: Educators (Primary).

An illustrated manual for implementation of the small group process approach in the bilingual, bicultural classroom. With a natural language learning environment as the goal, descriptions and suggestions for room environment, grouping procedures, activities and materials, and the teacher's role as a facilitator of learning are presented. Appendixes include diagrams of various room arrangements for Activity Centers, a Bibliography, and a Checklist for the teacher to evaluate the implementation of the small group process.

***Forming an Estudiantina and Symbols of Music Notation.***

- ★ Anne Horne (Calexico Intercultural Design); illustrated by Carolina Flores. Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas

78721. 1973. 104pp. \$2.50. English and Spanish; Music Instructors, All Levels.

Teacher's guide for music instruction in bilingual education. Units are adaptable to all levels, in Spanish or English. Contains music, words and instrumentation for use by beginning Estudiantinas, and sketches of costumes. Units include: elements involved in forming an Estudiantina, symbols of music notation, bilingual music vocabulary, and easy songs for beginners.

★ ***Handbook on Mexico for Elementary and Secondary Teachers.*** (Revised). Clark C. Gill and Julia Mellenbruch; illustrated by Neal Finer. Revised and published by the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. Revised 1973. 112pp. \$1.50. English: Educators—Resource materials. Originally published in 1971 by Extension Publications, The University of Texas at Austin, Austin, Texas.

This handbook identifies some key ideas about Mexico as a starting place for teaching about the country in some depth. The information and materials listed are presented in a way that lessons drawn from, and based on them, can be adapted to any level of the curriculum. Chapter V includes a large number of Selected Sources; Bibliographies; Lists of Books in Spanish; Sources of Materials; Curriculum Guides, Units, and Project Materials. The Appendix includes statistics, some important dates, national holidays, religious celebrations, and maps.

★ ***Learning to Learn / Aprendiendo a Aprender: Cognitive Growth Kits.*** Developed by the Regional Project Office, San Bernardino, California; Charles H. Herbert, Jr., Project Director. Available from the Dissemination Center



for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 144 task cards; 72 each, English and Spanish. \$12.00 each version. English and Spanish versions: Elementary.  
Includes Teacher Guide.

Designed specifically for use by bilingual children, with the intent of bringing the student to the point where he is aware of the learning processes he uses in the lessons. There are 12 kits containing six cards each in both languages; these are color-keyed according to Bloom's *Taxonomy of Educational Objectives: Cognitive Domain*. The task cards outline activities designed to help children learn methods of learning: Observing, Listening, Memory, Association, Classification, Systems, Translation, Interpretation, Application, Reasoning, Creativity and Judgements.

★ **LIVROS DE LEITURA.** (*Portuguese Readers*). Model Cities Curriculum Development Team, ESEA Title VII Bilingual Program. New Bedford Public Schools, Massachusetts. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. \$.05 per page reproduction cost (Xerox). Portuguese: Grades 4, 5, 6.

**Livro de Lettura para a IV Classe.** 40pp. Stories are sequentially ordered by level of difficulty, and followed by Questions relating to their content (comprehension). Some poetry, mainly in Portuguese with one or two in English, is included, as well as a lesson on the graphic development of alphabets.

**Livro de Lettura para a V Classe.** 56pp. Seven prose and two poetry selections include short adaptations of pieces by Mark Twain and Carol Ryrie Brink. Readings are arranged by level of difficulty.

***Livro de Lettura para a VI Classe.*** 66pp. Twelve selections, half prose, half poetry, are included. Some prose examples are "How Writers Use Language", "Arthur's Sword and the Death of the Giant", and an article about Gordon Parks, "An Explorer and his Camera"; among the poets represented are Manuel Maria Barbosa Du Bocage and Manuel da Fonseca.

★ ***Matemática Moderna, 5a Classe.*** Model Cities Curriculum Development Team, ESEA Title VII Bilingual Program, New Bedford Public Schools, Massachusetts. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 138pp. \$.05 per page reproduction cost (Xerox). Portuguese: Grade 5.

This student workbook presents fifth grade level modern mathematics in eight chapters covering: sets, numeration systems, addition and subtraction, multiplication and division, polygons, geometry, factors, and fractions. The final chapter is a review including the metric system, measurements, and equivalencies.

★ ***Mi Libro: Initial Reading in Spanish—Pre-Reading Workbook.*** Anthony R. Sancho; illustrated by Shirley Bean. Edited at the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 12pp., \$.35, Teacher's Edition 20pp., \$.50 (A Teacher's Edition accompanies individual child's copies.) Spanish: Pre-Reading.  
Initial Reading in Spanish Series.

Illustrated workbook designed for giving children practice in basic cursive writing strokes (motor skills), and develop

such concepts as colors, numbers, and visual perception through use as a coloring book and an initial reading primer. It allows teachers to plan group activities and individual exercises around its contents. The Teacher's Edition provides a suggested lesson outline, a brief explanation to the teacher, a story line, and lists of suggested activities for the 10 lessons. The back cover provides space for children to autograph each other's workbooks, using the skills learned in the manual.

★ ***Puedo Leer—I Can Read—Initial Reading in Spanish for Bilinguals.*** Charles H. Herbert, Jr., and Anthony R. Sancho; edited by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. Revised, 1972. 134pp. \$2.95. English and Spanish: Educators (Primary).

Original project grant for "Initial Reading in Spanish for Bilingual Children" sponsored by the Houston Independent School District, Houston, Texas.

Based on research reports by Mexican teachers from four project sites in Texas and videotaped documentation from Mexico, this manual contains some of the history of the project, the basic rationale, and lesson outlines for teaching initial reading in Spanish to first grade Spanish speaking children. Sections on pre-reading and concept-development are included, as well as suggestions for activities, games, and other devices for teaching reading skills. The method combines phonic and language experience approaches in a reading program, integrating reading, listening, speaking, and writing. Thirty-four lessons cover as many letters, clusters, and blends. The Appendix includes a Bibliography, Book Suggestions (Distributors, Basic Texts, Supplementary Books, Library



Books, Records), a description of the components of the Series, and an Index.

★ **SAÚDE: CURRICULUM GUIDES**—New Bedford Non-English Program. Model Cities Curriculum Development Team, ESEA Title VII Bilingual Program, New Bedford Public Schools, Massachusetts. Copies available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. \$.05 per page reproduction cost (Xerox). Portuguese: Grades 5, 6.

Adapted from *Health: Laidlaw Health Series*.

**Saúde, V Classe.** 84pp. (Teacher's Edition) The stated major behavioral objective for Health, Level Five, is "that each child develop the knowledge, skills, and attitudes he needs to insure healthful behavior in order to become healthy, mature and a total person to take his place in his changing world." Units include Growth, First Aid, Dental Hygiene, Eyes, Digestion, etc.

**Saúde, VI Classe.** 66pp. (Teacher's Edition) "The goal of Health and Growth is directed toward equipping the student with means to gain knowledge of his physical and mental health nutrition, his body and its functions, his attitudes toward himself and his community to develop the total person with safety and well-being." Topics included: man's fight against communicable disease; importance of physical examinations; nutrition; effects of alcohol, tobacco and drugs; how life is handed on, heredity.

★ **Small Group Activity Charts.** Prepared by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1971.



12 charts, 16"x20"; color. \$4.95 (Includes folding stand). Spanish (five). English (seven): Educators.

Companion title: *They Help Each Other Learn, A Group Participation and Leadership Training Manual*. (see page 18).

These large activity charts show the types of instructions used in small group lessons. The illustrated charts provide lessons which help develop skills in writing, vocabulary, general language development, and numbers. They provide a means for starting a small group interest center that focuses on developing group participation and leadership skills. The stand allows for easy display and use by children working at the interest center.

★ **Spanish Phonic Pull Charts.** Prepared by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. Individual chart 4" x 8", Class-size chart 13" x 22"; 8 letter strips each. Individual size \$1.50, Class size \$2.50. Spanish: Primary.

Initial Reading in Spanish Series.

Children manipulate the sliding letter strips to form syllables and words which appear in the center window of the chart. Two strips have consonants, two have vowels with appropriate accents, and four blank strips are provided.

★ **Spanish Reading Charts.** Charles H. Herbert, Jr., and Anthony R. Sancho; prepared by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 25 full

color charts, 17" x 23". \$10.00. Spanish: Educators (Primary).

Initial Reading in Spanish Series.

These charts were designed to supplement the teaching of sound-letter correspondence as well as the development of concepts in building words, phrases, and sentences. While the charts can be used separately, they reinforce the phonic approach used in the Initial Reading in Spanish Series. The illustrations apply the phonic method to letters, syllables, phrases, and complete sentences.

★ ***They Help Each Other Learn—A Group Participation and Leadership Training Manual.*** Jean M. Baker, Tana Smith, Barbara Walters and Ralph Wetzel. Edited by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1971 (Third Printing). 48pp. \$1.75. English: Educators. Companion materials: *Small Group Activity Charts* (see page 16).

An illustrated manual designed as a guide for teaching group participation and leadership skills. The five lessons are an important step in designating and managing an open classroom, and include seven precisely defined skills: reading and understanding group instructions, distributing materials, answering questions about the lesson, cleaning up the work area, helping each other, praising each other for good behavior in the group, and evaluating the group activity. The Appendix includes a follow-up discussion, reactions by teachers and teacher's aides, and a self-evaluation checklist for group members and group leaders.

### ***Things To Do—Activities for a Bilingual Classroom.***

★ Jean M. Baker, Joy Ross, and Barbara Walters; Edited by the Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 32pp. \$1.50. English (with Spanish); Educators (Primary).

Companion title: *Each One Learning, A Small Group Process Manual for Teachers* (see page 11).

A manual for teachers planning for small group organization in bilingual, bicultural programs. Several sample day schedules are included with a series of activities appropriate for small groups of children. Activities are of varying levels of complexity, in Spanish and English, and are organized around the content of several Learning or Interest Centers: a Communications Center (language arts, reading, writing), a Math Center, a Science/Social Studies Center, an Art Center, and a Music/Listening Center. Each sample activity includes instructions and a Commentary with rationale and suggestions for the teacher.

### ***We Learn Together—A Small Group Process Manual for***

★ ***Secondary Teachers.*** Anthony Sancho, David Otis, Sam Feldman; Regional Project Office, San Bernardino, California. Available from the Dissemination Center for Bilingual Bicultural Education, 6504 Tracor Lane, Austin, Texas 78721. 1972. 70pp. \$1.75. English; Educators (JHS and HS).

Adapted from: *Each One Learning, A Small Group Process Manual for Teachers* (see page 11).

An illustrated manual designed to illustrate the application of the small group process approach in bilingual edu-



cation programs at upper grade and secondary levels. Discussion and description of the rationale, room environment, grouping procedures, activities and materials, and the teacher's role are presented. The Appendix includes a several-page Bibliography and a Checklist for encouraging Spanish and English language development and for establishing a multicultural school environment. Examples of types of learning centers and their composition include Music, Listening, Writing, Art, Science, Math, Spanish, and Reading.



## STAFF

Juan D. Solís, Director

Joanna F. Chambers, Research Librarian

Elisa de León Gutiérrez, Bilingual Curriculum Consultant

Carlos E. Pérez, Editor

Sarah D. Frey, Assistant Editor

Martha I. Basden, Bilingual Secretary

Rhonda S. Henzi, Distribution Clerk

Susanna Cortez, Distribution Clerk

Dahlia Zavala, Clerk Technician

Tony Bell, Artist